

T. E. BARNUM.

ELECTRIC SWITCH.

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990,512.

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Fig. 2.

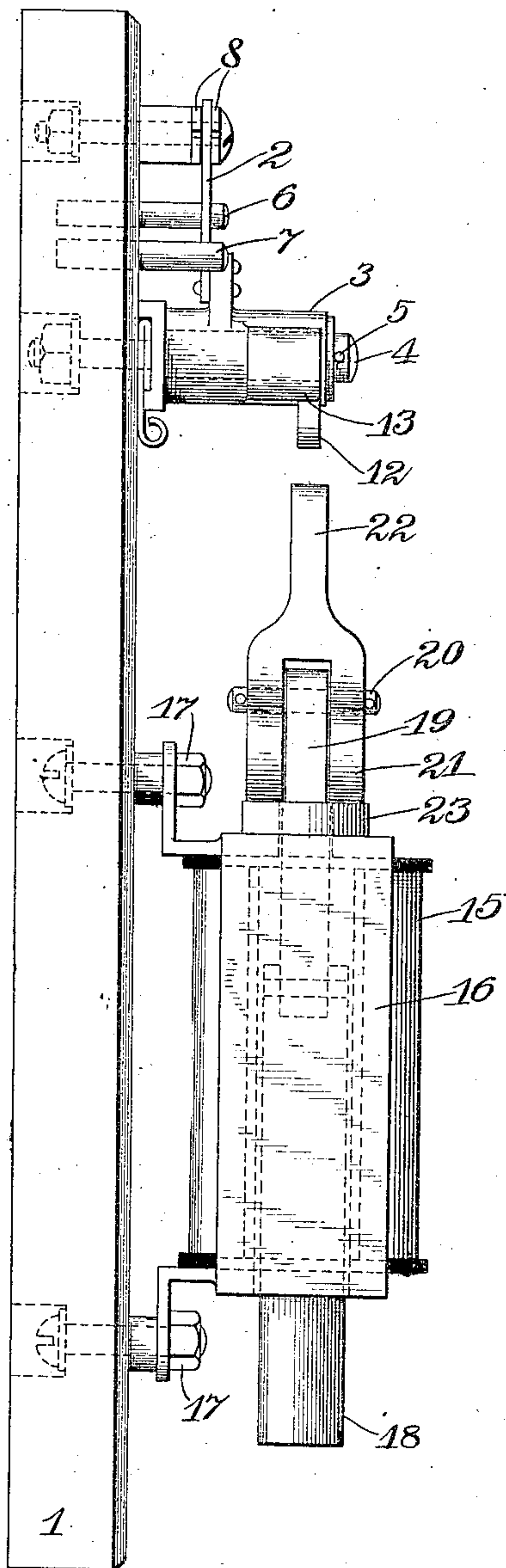
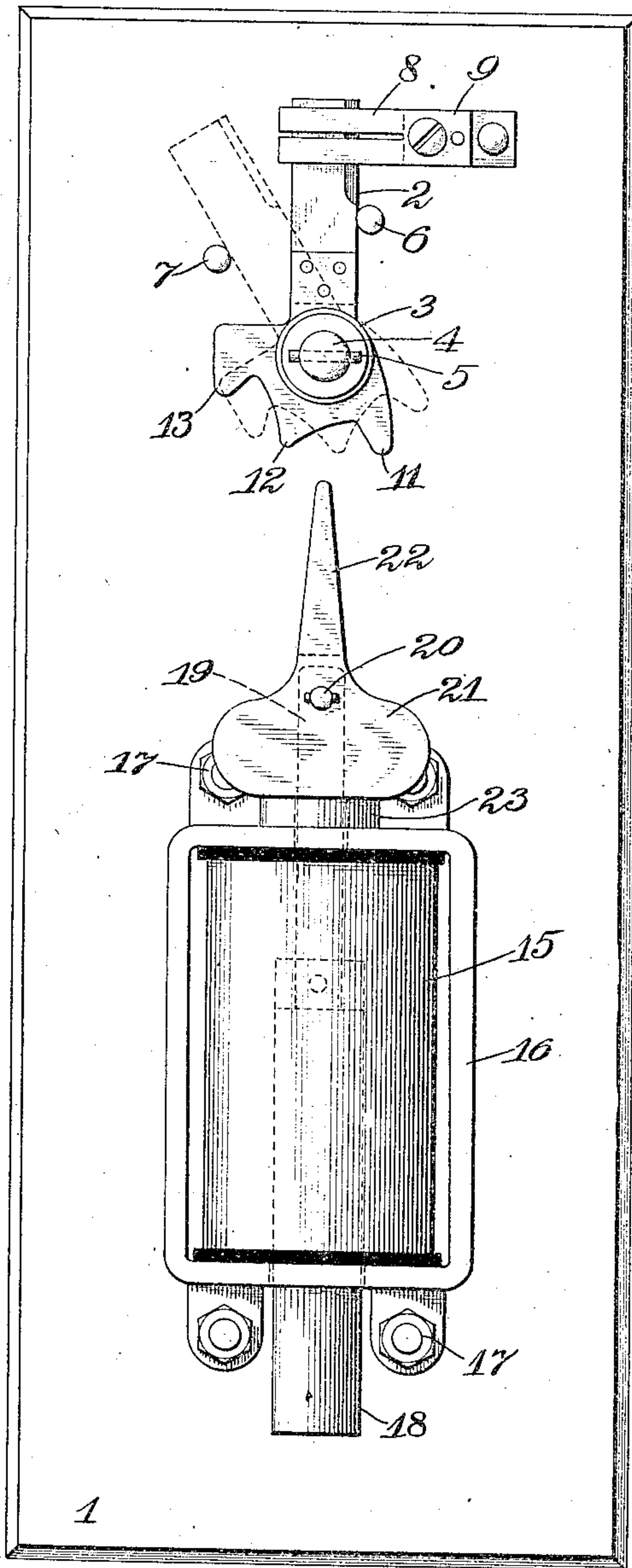


Fig. 1.



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ELECTRIC SWITCH.

990,512.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, THOMAS E. BARNUM, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Electric Switches, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to improvements in electric switches, and more particularly to those adapted to be controlled from a distance.

It is the object of my invention to provide a switch adapted to remain in either open or closed position, with a single operating winding adapted to be energized to both open and close the same. This arrangement requires but a single control circuit for both opening and closing the switch and enables the operating winding to be de-energized as soon as the switch has been moved into either open or closed position.

A further object of my invention is to provide means whereby the switch will be actuated with a hammer like blow.

For the purpose of more clearly disclosing my invention, I shall describe the device illustrated in the accompanying drawing, which shows the preferred form of my invention. It should be understood, however, that my invention is not limited to the specific structure illustrated.

In the accompanying drawing:—Figure 1 is a front elevation of the device, and Fig. 2 is a side elevation thereof.

The several parts of the device are preferably mounted upon an insulating base 1. The switch illustrated comprises a knife blade 2 secured to an elongated sleeve 3. The sleeve 3 is loosely mounted upon a spindle 4 which is secured to and projects forwardly from the base 1. The sleeve 3 is held in place on the spindle 4 by means of a pin 5 passing transversely through the end of said spindle. The blade 2 of the switch is movable between fixed stops 6 and 7 carried by the base 1, and is adapted to be in-

serted between suitable spring contact fingers 8 of a stationary contact 9 suitably secured to the base 1. At its forward end the sleeve 3 is provided with downwardly extending projections 11, 12 and 13. The projection 12 is preferably pointed, the walls thereof being inclined toward the base of the projections 11 and 13. The projection 12 is preferably so arranged that when the switch is in closed position, the point thereof will be disposed on one side of the axis of said switch, and when said switch is in open position, will be disposed on the opposite side of the axis thereof. The projection 13 is preferably enlarged to form a weight tending to rotate the sleeve 3 in a direction to throw the switch in open position against the stop 7. The friction between the spring fingers 8 and the switch blade 2, however, prevents said weight from returning the switch from full closed position to open position. The purpose of the weight is to insure the movement of the switch to full open position after it has been disengaged from the spring fingers 8.

The operating mechanism of the switch comprises a solenoid winding 15 mounted in a suitable supporting frame 16, secured to the base 1 by suitable means 17. The winding 15 is provided with a movable plunger 18. Secured to the upper end of the plunger 18 is a rectangular rod 19, which passes through a correspondingly shaped aperture in the top of the frame 16. The rectangular aperture in the frame prevents the rod 19 from turning. The solenoid is preferably so arranged on the base that an axial line through its plunger would pass through the axis of the switch. Fulcrumed on a pin 20, which passes transversely through the end of the rod 19, is a bifurcated member 21, which has an elongated pointed portion 22. Surrounding the rod 19 and resting upon the top of the magnet frame is a suitable cushion, of rubber or other material, 23 upon which the member 21 is adapted to bear. The cushion 23 thus forms a buffer for said member. The member 21 is preferably symmetrically con-

structed and is pivoted at such a point that it will always return to initial position after being rocked in either direction.

I shall now describe the operation of the device, assuming the parts to be in the position illustrated in full lines in Fig. 1. In this position of the switch the point of the projection 12 is disposed on the left hand side of the pivotal point of the switch, and on the left hand side of the elongated portion 22 of the member 21. Hence, upon energization of the winding 15 its plunger moves the member 21 upwardly until the point 22 thereof engages the right hand wall of the projection 12. During continued movement of the plunger, the wall of the projection 12 guides the end of the member 22 into engagement with the projection 11. During this movement of the plunger it will be seen that the member 21 is rocked on its pivot until its end is forced to one side of the pivotal point of the switch. As soon as this occurs, and as soon as the member 22 engages the projection 11, continued movement of the plunger 18 will rotate the sleeve 3 in a direction to move the switch blade 2 out of engagement with the spring fingers 8. Inasmuch as the plunger of the solenoid travels a considerable distance before any movement is imparted to the switch, the magnetic pull upon said plunger becomes very strong by the time the member 22 is in the position to impart movement to the switch, and consequently a hammer like blow is imparted thereto. As soon as the switch has been opened the winding 15 may be deenergized, whereupon the plunger 18 and the member 21 would return to initial position. In returning to initial position the member 21 turns on its pivot until the elongated portion 22 is again in alinement with the rod 19. In open position of the switch, as shown in dotted lines, Fig. 1, the end of the projection 12 is disposed on the opposite side of the axis of the switch and upon the opposite side of the elongated portion 22 of the member 21. Hence, when the magnet is again energized and the plunger 18 again raised, the wall of the projection 12 guides the end of the elongated portion 22 into engagement with the projection 13. Continued movement of the plunger thereupon turns the sleeve 3 in the opposite direction, thereby closing the switch. The winding 15 may then be deenergized, allowing the plunger and the member 21 to return to initial position. During movement of the switch to closed position, the projection 12 is again moved to the right hand side of the axis of the switch, and consequently, when the winding 15 is again energized, the member 22 will be guided into engagement with

the projection 11 with the result previously set forth. With this arrangement it will be seen that by means of a single switch the winding of the operating solenoid may be controlled to both open and close the switch.

I claim—

1. In an electric switch, in combination, a movable switch member biased toward one position and adapted to be moved to another position and electroresponsive means adapted when successively energized to cause movement of said switch member alternately from one of said positions to the other, said switch being maintained in said second mentioned position independently of said electroresponsive device.
2. In an electric switch, in combination, a movable switch member, a stationary co-operating contact adapted to frictionally hold said switch member, said switch member being biased in a direction away from its stationary contact, a reciprocating device adapted upon successive operations thereof in the same direction to move said switch alternately in opposite directions and an electromagnetic winding for operating said device.
3. In an electric switch, in combination, a pivoted switch member biased to move in one direction, an operating solenoid and a self adjusting member operated by said solenoid to cause said switch member to move alternately in opposite directions upon successive operation thereof in the same direction, said switch member being retained in closed position independently of said solenoid.
4. In an electric switch, in combination, a pivoted switch member biased toward open position, an operating solenoid therefor having a movable plunger and a pivoted member carried by said plunger and biased to a position from which it is movable in opposite directions, said pivoted member being adapted to engage said switch member alternately on opposite sides of its axis upon intermittent energization of said solenoid.
5. In an electric switch, in combination, a pivoted switch member biased toward open position and having a tapered portion, the extremity of which is adapted to be thrown to opposite sides of the pivotal point of said switch member upon movement thereof between open and closed position, a solenoid arranged below said switch member and having a plunger adapted to be moved upwardly when the same is energized and a pivoted pawl carried by said plunger and biased toward a position in which its extremity is in alinement with the pivotal point of said switch member, said solenoid when energized being adapted to move said pawl into engagement with said switch to

operate the same and the tapered portion of
said switch being adapted to guide said
pawl to one side or the other of the axis of
said switch member in accordance with the
5 position of said switch member and said
switch member being adapted to remain in
closed position independently of said so-
lenoid.

In witness whereof, I have hereunto sub-
scribed my name in the presence of two wit- 10
nesses.

THOMAS E. BARNUM.

Witnesses:

FRANK H. HUBBARD,
S. W. FITZ GERALD.